INVESTIGATOR'S ANNUAL REPORT

National Park Service

All or some of the information provided may be available to the public

Reporting Year: 1991	**Park:** Shenandoah NP
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Permit#: SHEN1991ABAV	
Park-assigned Study Id. #: unknown	
Project Title: Lichens as Monitors of Heavy Metals and Agents of Weathering	
Permit Start Date: Jan 01, 1998	**Permit Expiration Date** Jan 01, 1998
Study Start Date: Jan 01, 1989	**Study End Date** Jan 01, 1991
Study Status: Completed	
Activity Type: Other	
Subject/Discipline: Lichens	
Objectives: 1) Continue the investigation of depositional patterns of heavy metals in lichens to test their potential use for quantitative monitoring.;2) Study the role of lichens in the weathering of exposed rock.	
Findings and Status: We analyzed dated sequential growth of Flavoparmelia baltimorensis and Xanthoparmelia conspersa colonies (11 in all) collected in 1989 for Pb210, Po210, Pb, Cd, Cu, Ni, Zn, Cr and Fe using atomic absorption spectrophotometry for the heavy metals and alpha spectrometry for the radionuclides. It can be demonstrated that the heavy metals found in the lichens were derived from an atmospheric source via rainout and dry depostion. Pb210, Po210 and Pb levels (ug cm-2) increase monotonically with age in all samples with the same trend for other elements with some exceptions. A possible cause of an erratic gradient with age is the inhomogeneous distribution of metal-bearing particulates in each thallus or some disturbance altering metal concentrations, such as abnormally high runoff in the past, which may have washed out some heavy metals and not others, depending on their ion-exchange properties (Pb is, for example, more tightly held by the thallus than is Zn). The concentration range of lead (23-197 ppm) is similar to results reported from the Park by Lawrey and Hale (1988). Cd, Cr, Zn and Fe concentrations are similar to the range reported for two corticolous folious species from Maryland and Virginia (Olmez et al., 1985).;Computed lead fallout rates are in the range expected for rural areas, with the lead having been derived from an ambient anthropogenic atmospheric source. There is no clear trend in lead fallouts going back to 1982. Estimates of fallouts for other elements fall in the range reported form conventional air sampling in rural areas. These inferred fallouts are lower limits since trapping efficienceis are </= 100%.	
For this study, were one or more specimens collected and removed from the park but not destroyed during analyses? No	
Funding provided this reporting year by NPS: 0	**Funding provided this reporting year by other sources:** 1740
Fill out the following ONLY IF the National Park Service supported this project in this reporting year by providing money to a university or	

college	
Full name of college or university:	**Annual funding provided by NPS to university or college this reporting year:**
n/a	0